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REPORT NO. 710/14

TEST OF COMPOSITE PLATES FOR
ARMOR PLATE

by

D. J. MARTIN
1st Lt., Ord. Dept.

1934.

Report No. 710/14
Watertown Arsenal

April 9, 1934.

Test of Composite Plates for Armor Plate

The composite plates in this report are made up of combinations of Duralumin, Armor Plate and Low Carbon steel plate.

Combination "A" plate was put together as one plate without any spacing between the plate; this combination failed completely. The combination of plates was fired both at the front and back. The back of the plate when fired at, gave better results than the front; when fired at the front the cores made complete penetrations, but firing at the back, the cores stayed in the plate, the points just coming through the opposite side.

Combination "B" plate was made up as shown on sketch, with a space between the last and next to the last plate. Three rounds of service velocity (2460 f.s.) were fired at the plate here at Watertown Arsenal, and it was found that the cores stayed in the plate without damage to the back plate.

The plate was then sent to the Frankford Arsenal for further test and the data of the test is shown on the page following sketch of the plate combination

"B". This plate proved very satisfactory, except for its weight which exceeds the weight of regular 1/8" Home. A.P. We have in the process of being assembled, various combinations within the weight limit which will be tested soon and reports submitted.

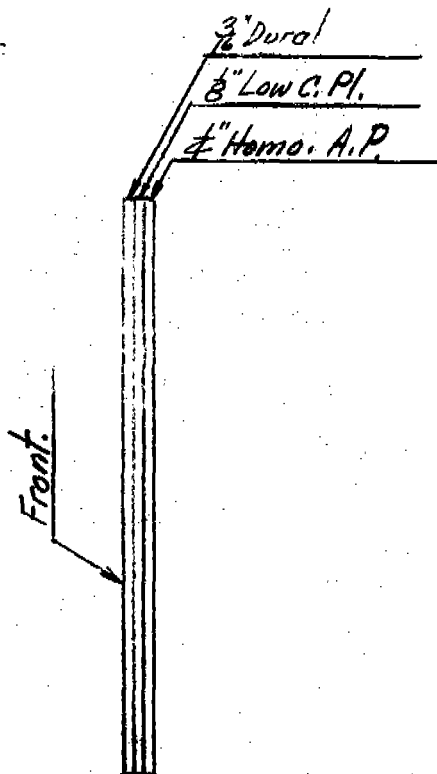
The photographs at the back of this report should be studied and special attention should be paid to the condition of the low carbon steel 1/8" plate and the dural sheet which gave with the core and flattered against the back plate.

Respectfully submitted:

D. J. Martin,
1st Lt., Ord.Dept.

PLATE NO. Combination "A"

DATE Feb. 19, 1934.



Rounds 1 to 4 inclusive were fired at front side of plate. Rounds A to C inclusive were fired at back side of plate.

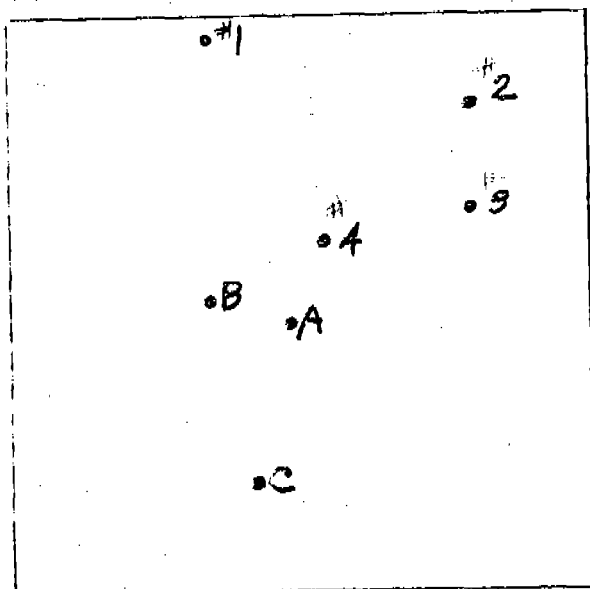
1/4"-50C Homogeneous Disston Plate Heat treated by Disston Co. in standard manner, oil quench 1600°F Draw 1100°F Brinell 400 to 430.

1/8" Low C Plate & 3/16" Dural Plate not heat treated

Purchase Order No. 6622.

Armor Plate Composition

C	Mn	P	S	Si	Cr	Mo	Va
.45/.56	.40/.60	<.03	<.03	.15/.25	1.10/1.30	.60/.80	.20/.30

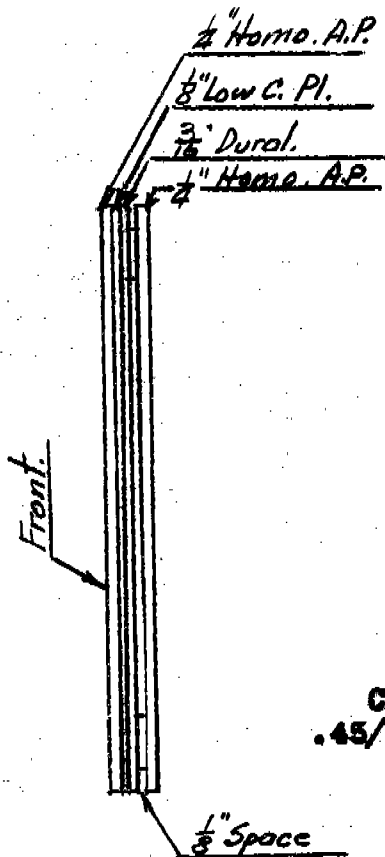


ROUND NO.	STRIKING VELOCITY	REMARKS
1	2460	
2	"	Comp. penetratio
3	"	"
4	"	"
A	2460	"
B	"	Comp. penetratio
C	"	points of core just through and core stayed in plate.

PLATE NORMAL, 100 YD. RANGE, .50 CAL. M1923 A.P. ROUNDS, ~~XXXX~~
~~XXXX~~ UNLESS NOTED OTHERWISE.

PLATE NO. Combination "B"

DATE Feb. 19, 1934.



This plate was found very good using 2460 f.s. velocity ammunition and Springfield rifle, and plate was sent to Frankford Arsenal for further firing test, the results of which are included within the pages of this report.

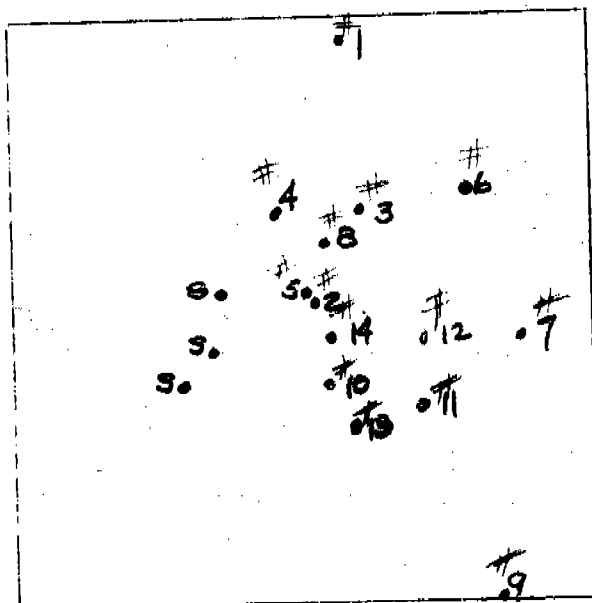
1/4"-50C Homogeneous Disston plate Heat treated by Disston Co. in standard manner, oil quench 1600°F Draw 1100°F Brinell 400 to 430.

1/8" Low C Plate & 3/16" Dural Plate not heat treated.

Purchase Order No. 6622.

Armor Plate Composition

C	Mn	P	S	Si	Cr	Mo
.45/.55	.40/.60	<.03	<.03	.15/.25	1.10/1.30	.60/.80
						VN .20/.30



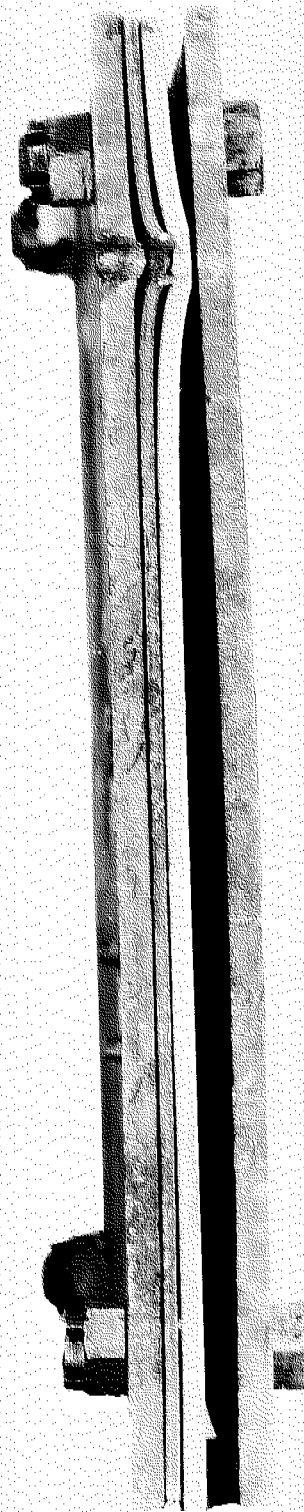
ROUND NO.	STRIKING VELOCITY	REMARKS
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S, S, & S.	2460	Bulged dural to face of back plate-no damage on back plate.
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Information on Rounds 1 to 14 inclusive which were fired at the plate at Frankford Arsenal, Feb. 26, 1934, is given on next page.

PLATE NORMAL, 100 YD. RANGE, .50 CAL. M1922 A.P. RIFLES, ~~XXXX~~
~~XXXXXX~~ UNLESS NOTED OTHERWISE.

<u>ROUND NO.</u>	<u>TYPE</u>	<u>STRIKING VELOCITY</u>	<u>REMARKS</u>
SSS (3)	30AP1922	2460 f.s.	Bulged Dural to face of back plate-no damage on back plate.
1	30-24 Gerlich	4000 f.s.	
2	"	"	
3	"	"	Bulged Dural, but not as much as SSS.
4	"	4100 f.s.	In same hold ^e no ^{off} damage, none of these
5	"	"	bothered back plate.
6	30APHVTI	2300 f.s.	No damage to back plate-these rounds
7	"	"	were not best Ammunition-some old bullets-
8	"	"	can't count so much.
9	"	"	
10	"	"	Partial-star crack-point of core shows 1/16" bulge.
11	"	"	Complete-went through drilled holes in back plate.
12	"	"	CIP-would have been complete except back-stop held core.
13	"	"	Same as 12.
14	"	"	Same as 10



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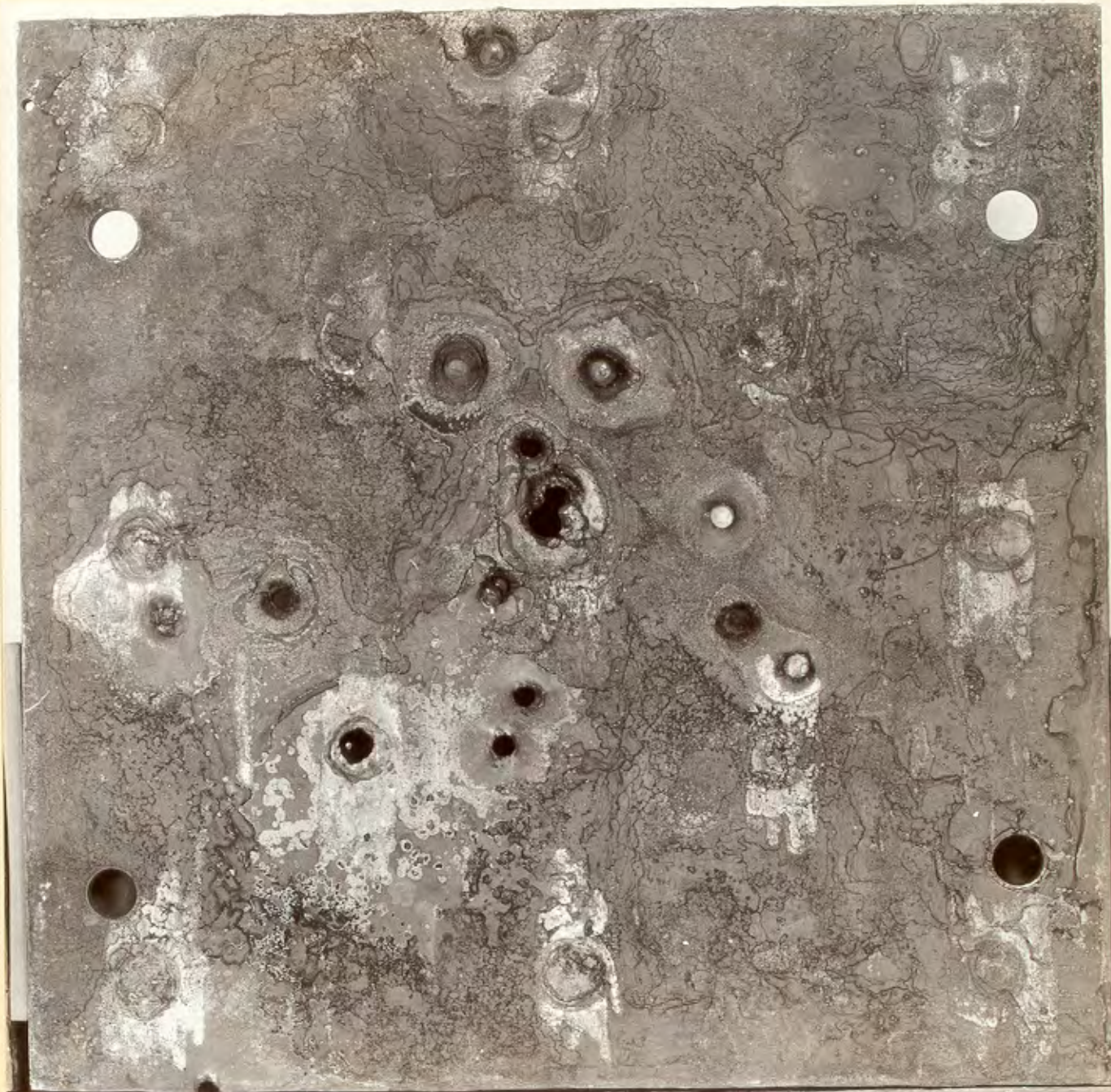


FRONT
OF
FRONT PLATE.

Ordinance Office

710/23

RECORDING CLERK



710-26

BACK
OF
FRONT PLATE.



FRONT
OF
LOW CARBON PLATE.



710-2B

BACK
OF
LOW CARBON PLATE.



710-29

FRONT
OF
DURAL PLATE.



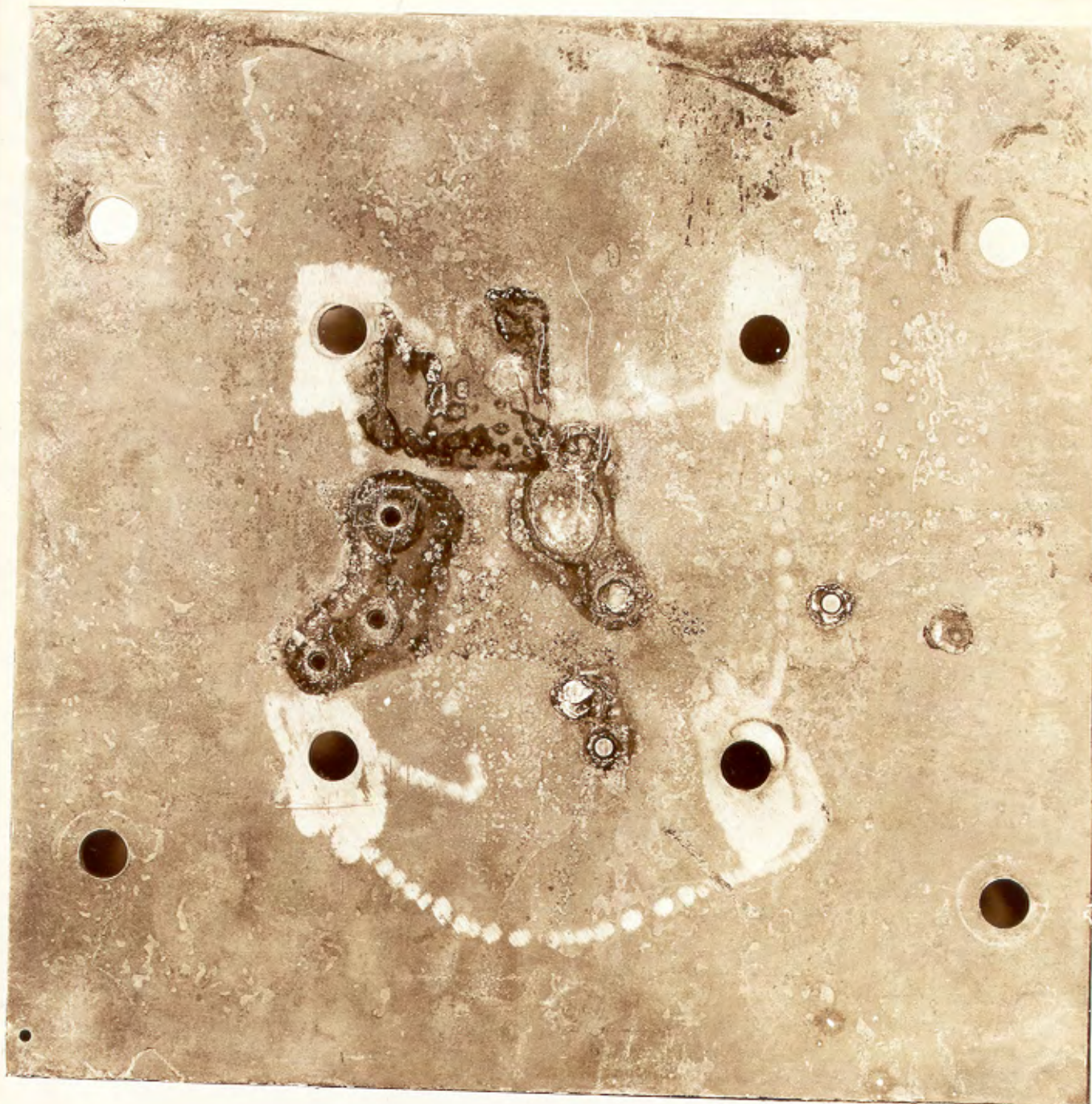
7/0-30

BACK
OF
DURAL PLATE

WAR DEPARTMENT
Ordnance Office

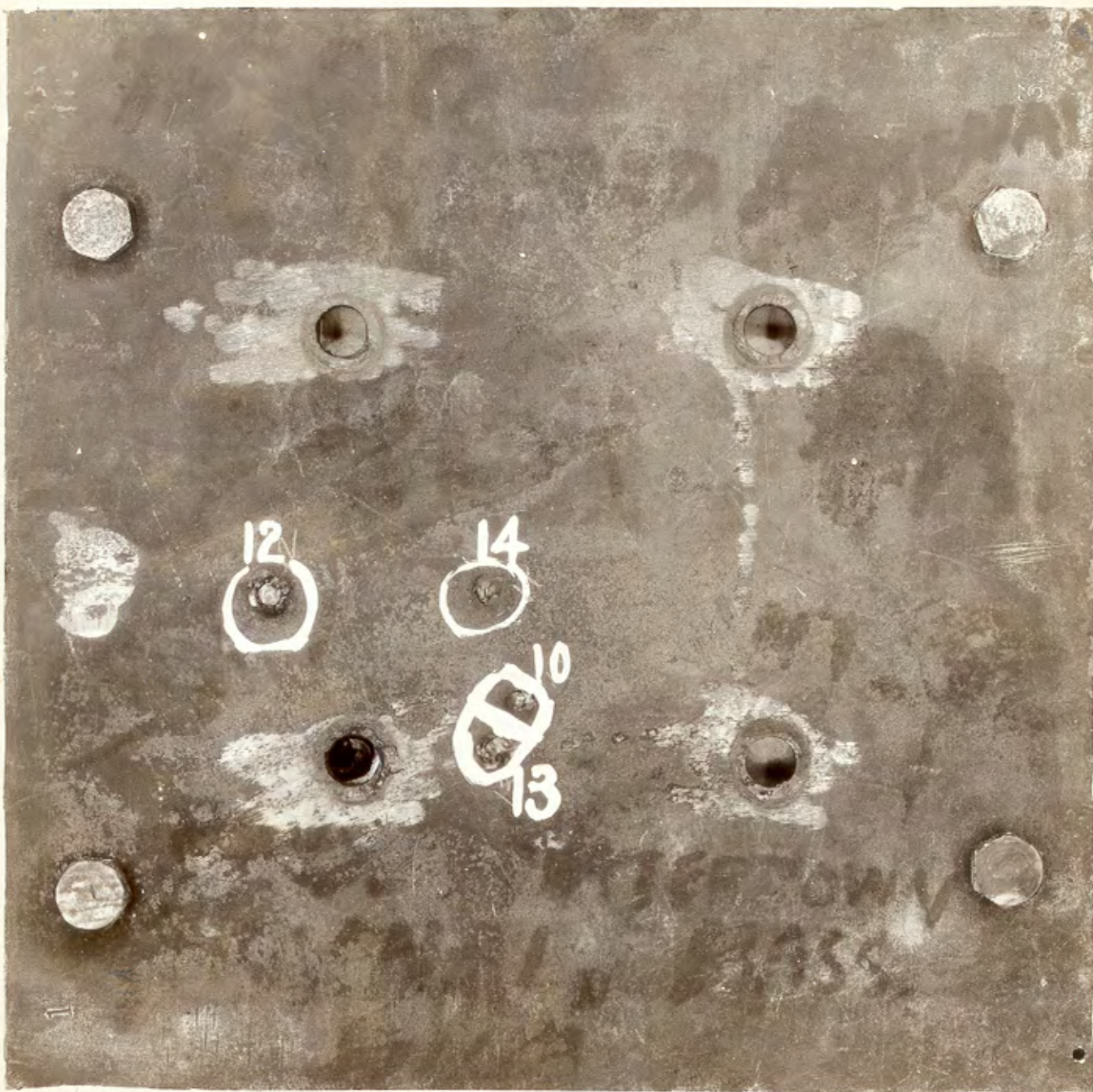
JUL 10 1934

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FRONT
OF
REAR PLATE



710-24

BACK OF REAR PLATE
REAR OF COMPOSITE PLATE